VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a Minor, Industrial permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9VAC25-260. The discharge results from the operation of a municipal potable water production plant. This permit action consists of reissuing the permit with revisions to the permit, as needed, due to changes in applicable laws, guidance, and available technical information.

1. Facility Name and Address: SIC Code: 4941- Water Supply System
   Churchville WTP
   PO Box 859
   Verona, VA 24482
   Location: 356 Buffalo Gap Highway, Churchville

2. Permit No. VA0084212 Expiration Date: April 30, 2015

3. Owner: Augusta County Service Authority
   Contact Name: Kenneth Fanfoni
   Title: Executive Director
   Telephone No: (540) 245-5670

4. Application Complete Date: November 4, 2014

   Permit Drafted By: Brandon Kiracofe Date: December 18, 2014
   Reviewed By: Bev Carver Date: December 18, 2014

   Public Comment Period:

5. Receiving Stream Name: Whiskey Creek
   River Mile: 1.51
   Basin: Potomac Subbasin: Shenandoah
   Section: 4a Class: IV
   Special Standards: pH, PWS
   Impaired? ☐ Yes ☑ No Tidal Waters? ☐ Yes ☑ No
   Watershed Name: VAV-H11R Middle River/Jennings Branch

6. Antidegradation Review & Comments per 9VAC25-260-30: Tier: 2

   The State Water Control Board's Water Quality Standards (WQS) includes an AD policy (9VAC25-260-30). All state surface waters are provided one of three levels of AD protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the WQS. Significant lowering of the water quality of Tier 2 water bodies is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The AD policy prohibits new or expanded discharges into exceptional waters.

   The antidegradation review begins with a Tier determination. Whiskey Creek in the immediate vicinity of Outfall 003 is determined to be a Tier 2 water because there are no data available that indicate WQS have been violated or are barely met. Since the receiving stream is determined to be Tier 2, no significant degradation of the existing water quality will be allowed.

   Antidegradation baselines have been established for TRC. Baselines were calculated as not more than 25% of the unused assimilative capacity of the criteria for the protection of aquatic life (acute and chronic) and not more than 10% for the protection of human health. The unused assimilative capacity is defined as the difference between existing water quality and the criterion for a specific pollutant. The baselines are shown in Appendix C.

7. Permit Characterization:
   ☐ Private ☐ Federal ☐ State ☑ POTW ☐ PVOTW
   ☐ Possible Interstate Effect ☐ Interim Limits in Other Document (attach copy of CSO)

8. Operator License Requirements per 9VAC25-31-200.C: N/A

9. Reliability Class per 9VAC25-790: N/A

10. Description of Treatment Works: **Appendix A**

    Total Number of Outfalls: 1

11. Site Inspection: Performed by Lisa Kelly on September 13, 2010

12. Effluent Screening and Effluent Limitations: **Appendix C**

13. Whole Effluent Toxicity (WET) testing requirements included per 9VAC25-31-220.D: ☐Yes ☑ No

    Although this facility's SIC Code falls within the category for which aquatic toxicity monitoring is typically required, this facility does not utilize any softening, filtration, or chemical addition for solids removal purposes. There is no filter backwash wastewater or softener regeneration wastewater generated. Any toxic effects from the chlorine added will be adequately addressed through the effluent TRC limits. For these reasons, WET testing requirements have not been included in the permit.

14. Management of Solids: Solids are not generated at this facility.

15. Permit Changes and Bases for Special Conditions: **Appendix D**

16. Material Storage per 9VAC25-31-280.B.2: This permit requires that the facility's O&M Manual include information to address the management of wastes, fluids, and pollutants which may be present at the facility, to avoid unauthorized discharge of such materials.

17. Antibacksliding Review per 9VAC25-31-220.L: The permit complies with the antibacksliding provisions of the VPDES Permit Regulation.

18. Impaired Use Status Evaluation per 9VAC25-31-220.D: Whiskey Creek is not listed as impaired; however, the Churchville WTP is included in the Middle River Bacteria and Sediment TMDL. The TMDL includes the following WLA for this discharge:

    E. coli: 2.44×10^{10} cfu/yr (based on a design flow of 0.14 MGD and a concentration of 126 cfu/100 mL)

19. Regulation of Users per 9VAC25-31-280.B.9: N/A – There are no industrial users other than the owner contributing to the discharge.

20. Stormwater Management per 9VAC25-31-120:
    Application Required? ☐ Yes ☑ No

    If "No," check one:
    - ☐ STPs: This facility does not have a design flow $\geq$ 1.0 MGD, nor is it required to have an approved POTW pretreatment program under 9VAC25-31-10 et seq.
    - ☑ Others: This facility's SIC Code(s) and activities do not fall within the categories for which a Stormwater Application submittal is required.

21. Compliance Schedule per 9VAC25-31-250: N/A – There are no compliance schedules included in this permit.

22. Variances/Alternative Limits or Conditions per 9VAC25-31-280.B, 100.H, and 100.N: None

23. Financial Assurance Applicability per 9VAC25-650-10: N/A – This facility is owned by a municipality.

24. Virginia Environmental Excellence Program (VEEP) Evaluation per § 10.1-1187.1-7:
At the time of this issuance, is this facility considered by DEQ to be a participant in the Virginia Environmental Excellence Program in good standing at either the Exemplary Environmental Enterprise (E3) level or the Extraordinary Environmental Enterprise (E4) level? ☐ Yes ☑ No

25. Nutrient Trading Regulation per 9VAC25-820:
Nutrient GP Required: ☐ Yes ☑ No

26. Threatened and Endangered (T&E) Species Screening per 9VAC25-260-20.B.8: Because this is not an issuance or reissuance that allows increased discharge flows, nor was a review requested, T&E screening was not conducted.

27. Nutrient monitoring included per Guidance Memo No. 14-2011: ☐ Yes ☑ No

    Because this facility does not use chemical additives containing nitrogen or phosphorus compounds, it is not expected to be a source of net Total Phosphorus or Total Nitrogen loads.

28. NPDES Permit Rating Worksheet: Score - 75 **Appendix A**

29. Public Notice Information per 9VAC25-31-280.B: All pertinent information is on file, and may be inspected and copied by contacting Brandon Kiracofe at: DEQ-Valley Regional Office, P.O. Box 3000, Harrisonburg, Virginia 22801, Telephone No. (540) 574-7892, or brandon.kiracofe@deq.virginia.gov.

    Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

30. Historical Record:

    - VPDES Permit No. VA0084212 was issued on May 1, 1990.
    - The permit was modified to move the outfall location from Whisky Creek, U.T. to Whiskey Creek in 2005. Outfall 001 is no longer in use.

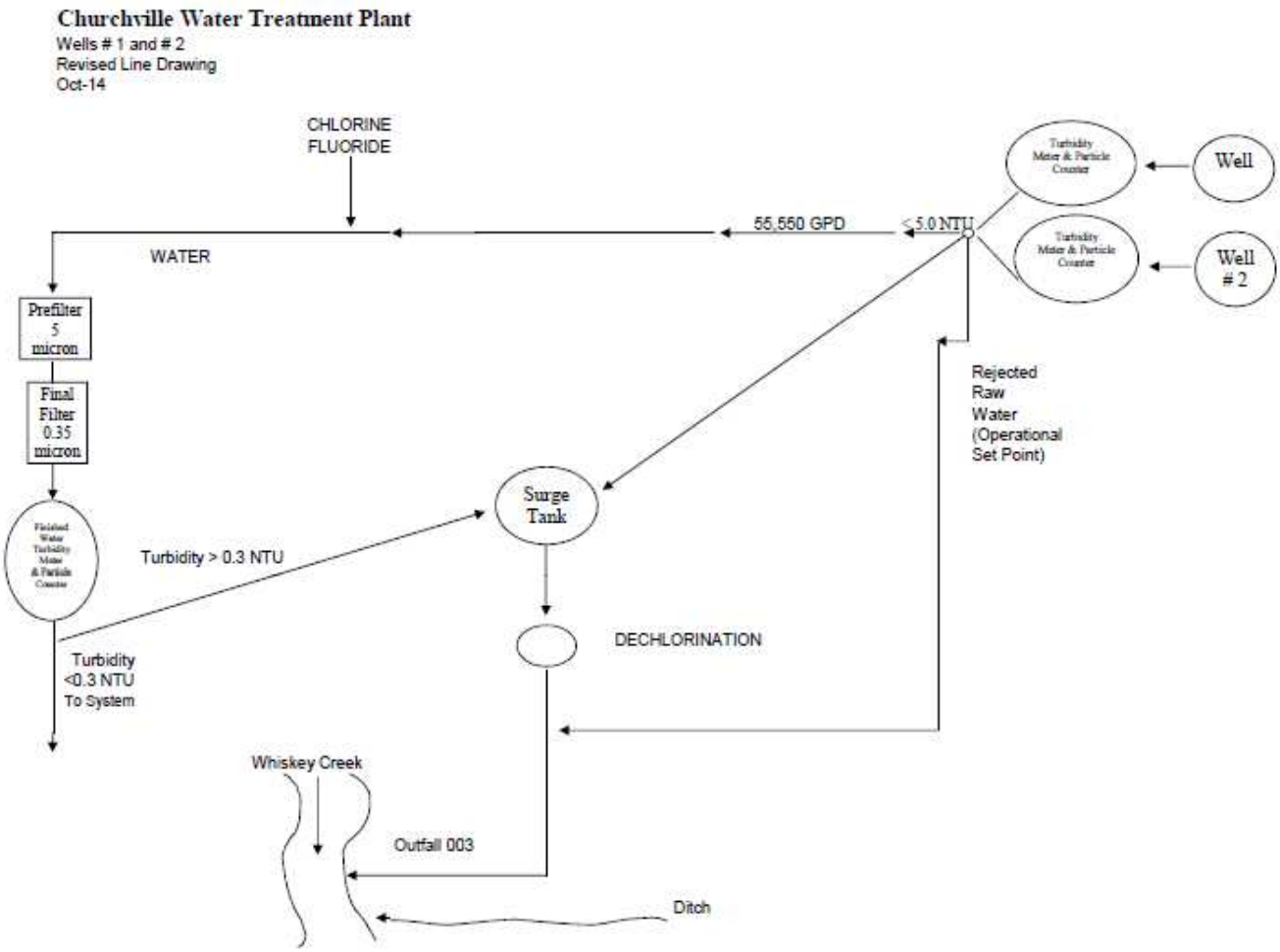
APPENDIX A

DESCRIPTION OF TREATMENT FACILITIES

WASTEWATER GENERATION & TREATMENT

The water treatment plant is designed to provide treatment to groundwater from two wells. The design flow for this facility is based upon the capacity of the dechlorination unit, which is 0.14 MGD. Previously, there were two discharge scenarios from the same discharge point that exist at this treatment plant. The first scenario consisted of the effluent from the water softener regeneration process, which was monitored as Outfall 002. The water softener at this facility has been taken out of service and will not be utilized in the future; therefore Outfall 002 has been removed from the permit. The second scenario consists of instrumentation water, rejected raw water, or rejected finished water, which was monitored as Outfall 003. Whenever the finished water turbidity reaches 0.5 NTU, this water is diverted to waste. It goes to the surge tank, then to dechlorination, and is then discharged via Outfall 003. The instrumentation water goes to the surge tank, then to dechlorination, and is then discharged via Outfall 003. Rejected raw water may also be discharged via Outfall 003. This water does not receive any treatment.

FLOW SCHEMATIC



VPDES PERMIT RATING WORK SHEET

Facilities identified under SIC Code 4941 have the following characteristics as defined in Appendix A to the NPDES Permit Rating Work Sheet found in the VPDES Permit Manual.

1987 SIC Code	1987 SIC Code Title	40 CFR 439 Sub-Part	Sub-part Title	Human Health Toxicity Number	Total Toxicity Number	Industrial Sub-category Number
4941	Potable Water Treatment Plant	NA	NA	7	7	NA

Factor 1 – Toxic Pollutant Potential - This rating is prescribed by the worksheet instructions regarding potable water treatment plant wastewater discharges. This is unchanged from the previous rating.

Factor 2 – Flow/Stream Flow Volume - Section A, Type II is selected because the discharge contains process wastewater. This is changed from the previous rating.

Factor 3.A. – Oxygen Demanding Pollutant - The permit does not contain limits for BOD_5 or COD. This is unchanged from the previous rating.

Factor 3.B. – TSS - The permit contains limits for TSS. This is unchanged from the previous rating.

Factor 3.C. – Ammonia - The permit does not contain limits for any Nitrogen pollutants. This is unchanged from the previous rating.

Factor 4. – Public Health Impact - A worst case assumption is made for proximity to public water supplies. This is unchanged from the previous rating.

Factor 5.A. – The facility is subject to water quality based effluent limits. This is unchanged from the previous rating.

Factor 5.B. – The receiving water is not in compliance with applicable WQS for pollutants that are water quality limited in the permit. This is changed from the previous rating.

Factor 5.C. – The permit does not include any Toxicity Management Program requirements. This is unchanged from the previous rating.

Factor 6. – Proximity to Near Coastal Waters: Headquarters Priority Permit Indicator (HPRI) Code #4 – This discharge occurs in a non-coastal county. This is unchanged from the previous rating.

NPDES PERMIT RATING WORK SHEET

[ ] Regular Addition
[ ] Discretionary Addition
[✓] Score change, but no status change
[ ] Deletion

NPDES NO. **VA0002674**
Facility Name: **Churchville WTP**
City: **Churchville**
Receiving Water: **Whiskey Creek**

Reach Number:

Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?
1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate
[ ] YES; score is 600 (stop here) [✓] NO (continue)

Is this permit for a municipal separate storm sewer serving a population greater than 100,000?

[ ] YES; score is 700 (stop here)
[✓] NO (continue)

FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: _____ Primary SIC Code: **4941** Other SIC Codes: _____
Industrial Subcategory Code: **000** (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
[ ] No process waste streams			[ ] 3.	3	15	[✓] 7.	7	35
[ ] 1.	1	5	[ ] 4.	4	20	[ ] 8.	8	40
[ ] 2.	2	10	[ ] 5.	5	25	[ ] 9.	9	45
			[ ] 6.	6	30	[ ] 10.	10	50

Code Number Checked : **7**

Total Points Factor 1: 35

FACTOR 2: Flow/Stream Flow Volume *(Complete either Section A or Section B; check only one)*

Section A [✓] Wastewater Flow Only Considered

Wastewater Type (See Instructions)		Code	Points
Type I: Flow < 5 MGD	[ ]	11	0
Flow 5 to 10 MGD Points	[ ]	12	10
Flow > 10 to 50 MGD	[ ]	13	20
Flow > 50 MGD	[ ]	14	30
Type II: Flow < 1 MGD	[✓]	21	10
Flow 1 to 5 MGD	[ ]	22	20
Flow > 5 to 10 MGD	[ ]	23	30
Flow > 10 MGD	[ ]	24	50
Type III: Flow < 1 MGD	[ ]	31	0
Flow 1 to 5 MGD	[ ]	32	10
Flow > 5 to 10 MGD	[ ]	33	20
Flow > 10 MGD	[ ]	34	3

Section B [ ] Wastewater and Stream Flow Considered

Wastewater Type (See Instructions)	Percent of Instream Wastewater Concentration at Receiving Stream Low Flow		Code	Points
Type I/III:	< 10 %	[ ]	41	0
	10 % to < 50 %	[ ]	42	10
	> 50 %	[ ]	43	20
Type II:	< 10 %	[ ]	51	0
	10 % to <50 %	[ ]	52	20
	> 50 %	[ ]	53	30

Code Checked from Section A or B: **21**

Total Points Factor 2: 10

FACTOR 3: Conventional Pollutants

(only when limited by the permit)

A. Oxygen Demanding Pollutant: (check one) [ ] BOD [ ] COD [ ] Other: N/A

			Code	Points
Permit Limits: (check one)	[ ]	< 100 lbs/day	1	0
	[ ]	100 to 1000 lbs/day	2	5
	[ ]	> 1000 to 3000 lbs/day	3	15
	[ ]	> 3000 lbs/day	4	20

Code Checked : **0**

Points Scored: **0**

B. Total Suspended Solids (TSS)

			Code	Points
Permit Limits: (check one)	[✓]	< 100 lbs/day	1	0
	[ ]	100 to 1000 lbs/day	2	5
	[ ]	> 1000 to 5000 lbs/day	3	15
	[ ]	> 5000 lbs/day	4	20

Code Checked : **1**

Points Scored: **0**

C. Nitrogen Pollutant: (check one) [ ] Ammonia [ ] Other: N/A

		Nitrogen Equivalent	Code	Points
Permit Limits: (check one)	[ ]	< 300 lbs/day	1	0
	[ ]	300 to 1000 lbs/day	2	5
	[ ]	> 1000 to 3000 lbs/day	3	15
	[ ]	> 3000 lbs/day	4	20

Code Checked : **0**

Points Scored: **0**

Total Points Factor 3: **0**

FACTOR 4: Public Health Impact

Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.

[X] YES (If yes, check toxicity potential number below)

[ ] NO (If no, go to Factor 5)

Determine the human health toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column [ ] check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
[ ] No process waste streams	0	0	[ ] 3.	3	0	[✓] 7.	7	15
[ ] 1.	1	0	[ ] 4.	4	0	[ ] 8.	8	20
[ ] 2.	2	0	[ ] 5.	5	5	[ ] 9.	9	25
			[ ] 6.	6	10	[ ] 10.	10	30

Code Number Checked : **7**

Total Points Factor 4: **15**

FACTOR 5: Water Quality Factors

A. Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge:

		Code	Points
[✓]	Yes	1	10
[ ]	No	2	0

B. Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?

		Code	Points
[ ]	Yes	1	0
[✓]	No	2	5

C. Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?

		Code	Points
[ ]	Yes	1	10
[✓]	No	2	0

Code Number Checked : A 1 B 2 C 2

Total Points Factor 5: A **10** + B **5** + C **0** = **15** TOTAL

FACTOR 6: Proximity to Near Coastal Waters

A. Base Score: Enter flow code here (from Factor 2): **21**

Enter the multiplication factor that corresponds to the flow code: **0.10**

Check appropriate facility HPRI Code (from PCS):

	HPRI#	Code	HPRI Score
[ ]	1	1	20
[ ]	2	2	0
[ ]	3	3	30
[✓]	4	4	0
[ ]	5	5	20

Flow Code	Multiplication Factor
11, 31, or 41	0.00
12, 32, or 42	0.05
13, 33, or 43	0.10
14 or 34	0.15
21 or 51	0.10
22 or 52	0.30
23 or 53	0.60
24	1.00

HPRI code checked: 4

Base Score: (HPRI Score) **0** x (Multiplication Factor) **0.10** = **0** (TOTAL POINTS)

B. Additional Points --- NEP Program
For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay? **N/A**

	Code	Points
[ ] Yes	1	10
[ ] No	2	0

C. Additional Points --- Great Lakes Area of Concern
For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see Instructions)*?* **N/A**

	Code	Points
[ ] Yes	1	10
[ ] No	2	0

Code Number Checked : A 4 B N/A C N/A

Points Factor 6: A **0** + B **N/A** + C **N/A** = **0** TOTAL

Score Summary

Factor	Description	Total Points
1	Toxic Pollutant Potential	**35**
2	Flows/Stream Flow Volume	**10**
3	Conventional Pollutants	**0**
4	Public Health Impacts	**15**
5	Water Quality Factors	**15**
6	Proximity to Near Coastal Waters	**0**
	TOTAL (Factors 1-6)	**75**

S1. Is the total score equal to or greater than 80? [ ] Yes (Facility is a major) [✓] No

S2. If the answer to the above questions is no, would you like this facility to be discretionary major?

[✓] No

[ ] Yes (Add 500 points to the above score and provide reason below:

Reason:

NEW SCORE: 75

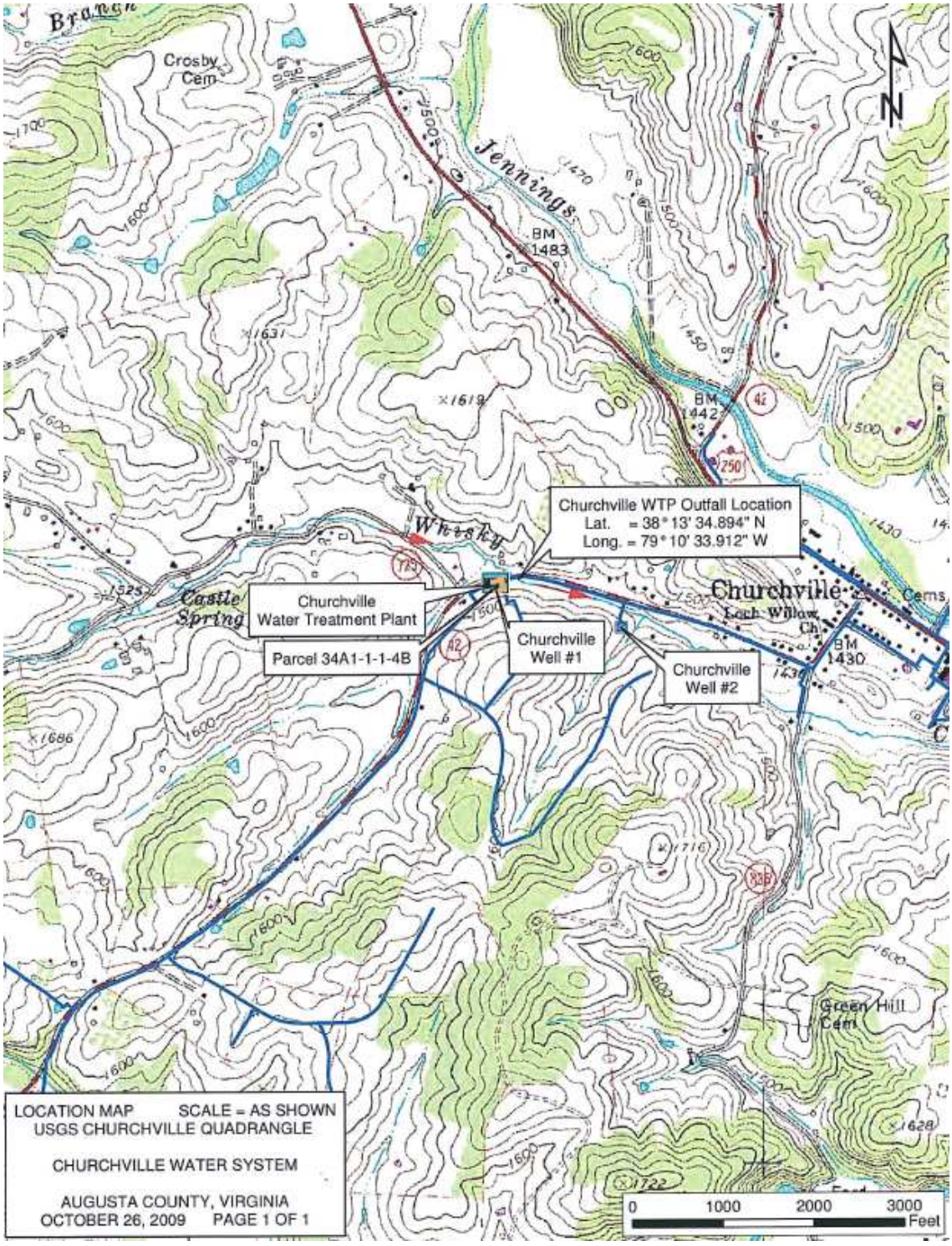
OLD SCORE: 60

Fact Sheet – VPDES Permit No. VA0084212 – Churchville WTP

APPENDIX B

DISCHARGE LOCATION DESCRIPTION AND RECEIVING WATERS INFORMATION

Churchville WTP discharges to Whiskey Creek in Augusta County. The topographical map below shows the location of Outfall 001.



TMDL & PLANNING EVALUATION

Relevant points of interest within the Cooks Creek watershed and in the vicinity of the subject discharge are shown on the Water Quality Assessments Review.

WATER QUALITY ASSESSMENTS REVIEW
POTOMAC-SHENANDOAH RIVER BASIN
11/10/2014

IMPAIRED SEGMENTS

SEGMENT ID	STREAM	SEGMENT START	SEGMENT END	SEGMENT LENGTH	PARAMETER
B15R-01-BAC	Middle River	43.06	0.00	43.06	Fecal Coliform, E-coli
B10R-03-BAC	Back Creek	8.36	0.00	8.36	Fecal Coliform, E-coli
B10R-04-BAC	Eidson Creek	8.62	0.00	8.62	Fecal Coliform, E-coli
B10R-02-BEN	Middle River	69.00	53.29	15.71	Benthic
B10R-02-BAC	Middle River	69.00	46.66	22.34	Fecal Coliform, E-coli
B13R-02-BAC	Elk Run	4.00	0.00	4.00	Fecal Coliform
B13R-01-BAC	Moffett Creek	8.55	0.00	8.55	Fecal Coliform
B13R-01-BEN	Moffett Creek	8.55	0.00	8.55	Benthic

PERMITS

PERMIT	FACILITY	STREAM	RIVER MILE	LAT	LONG	WBID
VA0084212	**Churchville WTP**	**Whisky Creek**	**1.51**	**381335**	**791034**	**VAV-B11R**
VA0092321	Dry Branch WTP-001	Dry Branch	3.23	381245	791337	VAV-B11R
VA0092321	Dry Branch WTP-002	Dry Branch UT	3.26	381242	791338	VAV-B11R
VA0092321	Dry Branch WTP-003	Dry Branch	3.24	381244	791337	VAV-B11R
VA0092321	Dry Branch WTP-004	Dry Branch UT	3.26	381242	791338	VAV-B11R
VA0092631	Ashby WTP	East Dry Branch	0.95	381235	791133	VAV-B11R

MONITORING STATIONS

STREAM	NAME	RIVER MILE	RECORD	LAT	LONG
Back Creek	1BBAK000.10	0.1	7/26/06	380857	791105
Back Creek	1BBAK000.81	0.81	7/26/06	380836	791128
Buttermilk Spring	1BBMS000.25	0.25	5/2/05	380841	790447
Buttermilk Spring	1BBMS001.68	1.68	5/2/05	380846	790610
Elk Run	1BEKR000.25	0.25	5/16/01	381544	790621
Jennings Branch	1BJEN002.46	2.46	7/1/91	381354	791005
Middle River	1BMDL060.48	60.48	7/1/99	380830	791307
Middle River	1BMDL047.90	47.9	5/16/01	381208	790908
Middle River	1BMDL051.36	51.36	7/1/99	381128	790953
Moffett Creek	1BMET006.24	6.24		381736	790739
Moffett Creek	1BMFT001.43	1.43	5/16/01	381511	790607
Moffett Creek	1BMFT006.20	6.20	7/1/91	381737	790734
Moffett Creek	1BMFT005.11	5.11	10/16/00	381715	790630
Moffett Creek	1BMFT006.24	6.24	10/27/93	381735	790739
Moffett Creek	1BMFT002.46	2.46	3/20/08	381543	790604

PUBLIC WATER SUPPLY INTAKES

OWNER	STREAM	RIVER MILE
STAUNTON, CITY OF	MIDDLE RIVER	43.94
STAUNTON, CITY OF	GARDNER SPRING	0

WATER QUALITY MANAGEMENT PLANNING REGULATION

Is this discharge addressed in the WQMP regulation? **No**

If Yes, what effluent limitations or restrictions does the WQMP regulation impose on this discharge?

PARAMETER	ALLOCATION

WATERSHED NAME

VAV-B11R Middle River/Jennings Branch

FLOW FREQUENCY DETERMINATION/MIXING ZONE EVALUATION

There are no new site specific flow measurements for Whiskey Creek and the flow frequencies of the Middle River gage (#01625000) have not changed significantly; therefore, the previous flow frequency (included below) has been carried forward at this reissuance.

The discharge point is located just upstream of Route 42. The flow in Whisky Creek is influenced by flow from Castle Spring located approximately 0.75 miles upstream of the discharge point. In order to estimate the flow frequencies in Whisky Creek at the discharge point, the flow contributed by Castle Spring and Whisky Creek had to be evaluated separately.

The flow contributed by Castle Spring was determined from a total of 61 measurements of the spring discharge made by the USGS in 1941, 1947, 1949-1956, and 1963. The discharge measurements ranged from 0.80 cfs to 2.22 cfs. For the purposes of this analysis, the lowest measured flow (0.80 cfs) will be added to the flow contributed by Whisky Creek.

The flow contributed by Whisky Creek was determined using a single flow measurement made by the USGS on October 15, 1941 at a point just upstream of Castle Spring. On that day, the USGS measured 0.16 cfs in Whisky Creek and 1.01 cfs discharging from Castle Spring. The Whisky Creek measurement was plotted on a log/log graph against the same day daily mean flow for the Middle River gage located near Grottoes, VA (#01625000). A 45° line was drawn through the point and a formula of the line was developed. The flow frequencies for Whisky Creek above Castle Spring were then calculated using the formula of the line and the flow frequencies for the entire period of record of the Middle River gage. These calculated flow frequencies for Whisky Creek above Castle Spring were then used in a drainage area comparison to determine the incremental flow contributed by Whisky Creek in the section of watershed lying between Castle Spring and the discharge point. The final flow frequencies in Whisky Creek at the discharge point were determined by adding the respective flows for Whisky Creek above Castle Spring to the flows for the segment between Castle Spring and the discharge point, and the minimum flow from Castle Spring. The flow frequencies are presented below. The analysis assumes that there are no significant discharges, withdrawals, or springs lying between Castle Spring and the discharge point.

Middle River near Grottoes, VA (#01625000):
Drainage Area = 373 mi^2

1Q30 =	33 cfs	High Flow 1Q10 =	70 cfs
1Q10 =	44 cfs	High Flow 7Q10 =	80 cfs
7Q10 =	49 cfs	High Flow 30Q10 =	97 cfs
30Q10 =	56 cfs	HM =	156 cfs
30Q5 =	66 cfs		

Whisky Creek above Castle Spring:
Drainage Area = 3.00 mi^2

1Q30 =	0.08 cfs	High Flow 1Q10 =	0.17 cfs
1Q10 =	0.11 cfs	High Flow 7Q10 =	0.19 cfs
7Q10 =	0.12 cfs	High Flow 30Q10 =	0.23 cfs
30Q10 =	0.13 cfs	HM =	0.37 cfs
30Q5 =	0.16 cfs		

Whisky Creek between Castle Spring and the discharge point:
Drainage Area = 1.49 mi^2

1Q30 =	0.039 cfs	High Flow 1Q10 =	0.084 cfs
1Q10 =	0.055 cfs	High Flow 7Q10 =	0.094 cfs
7Q10 =	0.060 cfs	High Flow 30Q10 =	0.11 cfs
30Q10 =	0.065 cfs	HM =	0.18 cfs
30Q5 =	0.079 cfs		

Whisky Creek at the discharge point:
Drainage Area = 4.49 mi^2

1Q30 =	0.08 cfs + 0.80 cfs + 0.039 cfs = 0.918 cfs	0.59 MGD
1Q10 =	0.11 cfs + 0.80 cfs + 0.055 cfs = 0.965 cfs	0.62 MGD
7Q10 =	0.12 cfs + 0.80 cfs + 0.060 cfs = 0.980 cfs	0.63 MGD
30Q10 =	0.13 cfs + 0.80 cfs + 0.065 cfs = 0.995 cfs	0.64 MGD
30Q5 =	0.16 cfs + 0.80 cfs + 0.079 cfs = 1.039 cfs	0.67 MGD
High Flow 1Q10 =	0.17 cfs + 0.80 cfs + 0.084 cfs = 1.054 cfs	0.68 MGD
High Flow 7Q10 =	0.19 cfs + 0.80 cfs + 0.094 cfs = 1.084 cfs	0.70 MGD
High Flow 30Q10 =	0.23 cfs + 0.80 cfs + 0.110 cfs = 1.14 cfs	0.74 MGD
HM =	0.37 cfs + 0.80 cfs + 0.180 cfs = 1.35 cfs	0.87 MGD

The high flow months are January through May.

EFFLUENT/STREAM MIXING EVALUATION

Mixing zone predictions were made with the Virginia DEQ Mixing Zone Analysis Version 2.1 program. The predictions are based on the discharge and receiving stream characteristics, and are presented below.

Effluent Flow = 0.14 MGD
Stream 7Q10 = 0.63 MGD
Stream 30Q10 = 0.64 MGD
Stream 1Q10 = 0.62 MGD
Stream slope = 0.08815427 ft/ft
Stream width = 7 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .1526 ft
Length = 217.89 ft
Velocity = 1.1161 ft/sec
Residence Time = .0023 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .1537 ft
Length = 216.49 ft
Velocity = 1.1217 ft/sec
Residence Time = .0022 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .1514 ft
Length = 219.39 ft
Velocity = 1.1104 ft/sec
Residence Time = .0549 hours

Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

APPENDIX C

EFFLUENT SCREENING AND EFFLUENT LIMITATIONS

Effluent Limitations

A comparison of technology and water quality-based limits was performed, and the most stringent limits were selected. The selected limits are summarized in the table below.

Outfall 003 **Design Flow: 0.14 MGD**

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average	Maximum	Frequency	Sample Type
Flow (MGD)	1,3	NL	NL	1/Month	Estimate
TSS (mg/L)	1,3.4	30	60	1/Month	Composite
Total Residual Chlorine (TRC)(mg/L)	1,2,3	0.022	0.022	1/Month	Grab
E. coli (N/100 mL)	2,4	126 (Geometric Mean)	NA	4/Month in any single calendar month	Grab
---	---	Minimum	Maximum	---	---
pH (S.U.)	1,2,3	6.5	9.5	1/Month	Grab

NL = No Limitation, monitoring required
Composite = For continuous discharges, five grab samples collected at hourly intervals. For batch discharges, five grab samples taken at evenly placed intervals until the discharge ceases, or until a minimum of five grab samples have been collected. For continuous or batch discharges, the first grab shall occur within 15 minutes of commencement of the discharge.
4/Month in any single calendar month = 4 samples taken monthly, with at least 1 sample taken each calendar week, in any calendar month and reported with the December DMR due January 10th of each year

BASIS DESCRIPTIONS
1. *VPDES Permit Manual*
2. *Water Quality Standards (9VAC25-260)*
3. *General VPDES Permit for Potable Water Treatment Plants (9VAC25-860)*
4. *Middle River Bacteria and Sediment TMDL*

Limiting Factors – Overview:

The following potential limiting factors have been considered in developing this permit and fact sheet:

Water Quality Management Plan Regulation (WQMP)(9VAC25-720)	
A. TMDL limits	**E. coli**
B. Non-TMDL WLAs	**None**
C. CBP WLAs	**None**
Federal Effluent Guidelines	**None**
BPJ/Agency Guidance limits	**pH, TSS**
Water Quality-based Limits - numeric	**pH, TRC**
Water Quality-based Limits - narrative	**None**
Toxics Management Plan (TMP)	**See Pages C-3 to C-5**
Storm Water Limits	**None**

EVALUATION OF THE EFFLUENT – CONVENTIONAL POLLUTANTS

Standard limits for pH and standard monitoring requirements for flow, pH, and TSS as specified in the VPDES Permit Manual for WTP backwash wastewater discharges were applied to the permit. There is no evidence to indicate these limits should not be applied to the discharge, or that other WQS parameters require effluent limits and/or monitoring.

The TSS concentration limits reflect the standard limits for WTPs included in the VPDES Permit Manual and General VPDES Permit for Potable Water Treatment Plants (9VAC25-860). The limits have been carried forward from the previous permit.

The pH limits reflect the current WQS for pH in the receiving stream, are based on the VPDES Permit Manual and General VPDES Permit for Potable Water Treatment Plants (9VAC25-860), and have been carried forward from the previous permit.

The E. coli limits are consistent with the facility's TMDL WLA and have been carried forward from the previous permit. The monitoring frequency has been changed from 1/Month to 4/Month in any single calendar month.

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EVALUATION OF THE EFFLUENT – NUTRIENTS

Nutrient monitoring and limits are currently not required for this industrial facility.

EVALUATION OF EFFLUENT TOXIC POLLUTANTS

Because metals (Cadmium, Chromium III, Chromium VI, Copper, Lead, Manganese, Mercury, and Zinc) have been previously evaluated, a toxics evaluation for these parameters is not required. TRC is the only toxic parameter requiring evaluation at this reissuance. The Water Quality Criteria (WQC) for TRC are not dependent on temperature, pH, or hardness. WQC and WLAs were calculated for TRC and are presented in this appendix. Because chlorine is utilized in the potable water production process, a default effluent concentration of 20 mg/L was utilized in the evaluation to generate an effluent limit. Limits were previously based on the discharge being intermittent, but at the permittee's request, the limits at this reissuance were based on the discharge being continuous. This resulted in the determination of more stringent TRC limits. No compliance schedule for the more stringent limits has been included in the permit because the more the stringent limits are expected to achieved by the current facility.

WQS-WLA SPREADSHEET – Input

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS

Facility Name: Churchville WTP

Receiving Stream: South Fork Shenandoah River, UT

Permit No.: VA0084212

Date: 12/17/2014

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information			Effluent Information	
Mean Hardness (as CaCO3) =	mg/L	1Q10 (Annual) =	0.62 MGD	Annual	- 1Q10 Flow =	100 %	Mean Hardness (as CaCO3) =	mg/L
90% Temperature (Annual) =	deg C	7Q10 (Annual) =	0.63 MGD		- 7Q10 Flow =	100 %	90% Temp (Annual) =	deg C
90% Temperature (Wet season) =	deg C	30Q10 (Annual) =	0.64 MGD		- 30Q10 Flow =	100 %	90% Temp (Wet season) =	deg C
90% Maximum pH =	SU	1Q10 (Wet season) =	0 MGD	Wet Season	- 1Q10 Flow =	%	90% Maximum pH =	SU
10% Maximum pH =	SU	30Q10 (Wet season) =	0 MGD		- 30Q10 Flow =	%	10% Maximum pH =	SU
Tier Designation =	2	30Q5 =	0.67 MGD				1992 Discharge Flow =	0.14 MGD
Public Water Supply (PWS) Y/N? =	N	Harmonic Mean =	0.87 MGD				Discharge Flow for Limit Analysis =	0.14 MGD
V(alley) or P(iedmont)? =	V							
Trout Present Y/N? =	N							
Early Life Stages Present Y/N? =	Y							

Footnotes:

1. All concentrations expressed as micrograms/ liter (ug/ l), unless noted otherwise.
2. All flow values are expressed as Million Gallons per Day (MGD).
3. Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.
4. Hardness expressed as mg/ l CaCO3. Standards calculated using Hardness values in the range of 25-400 mg/ l CaCO3.
5. "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.
6. Carcinogen "Y" indicates carcinogenic parameter.
7. Ammonia WQSs selected from separate tables, based on pH and temperature.
8. Metals measured as Dissolved, unless specified otherwise.
9. WLA = Waste Load Allocation (based on standards).
10. WLA = Waste Load Allocation (based on standards).
11. WLAs are based on mass balances (less background, if data exist).
12. Acute - 1 hour avg. concentration not to be exceeded more than 1/ 3 years.
13. Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/ 3 years.
14. Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows.
15. Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).

WQS-WLA SPREADSHEET – Output

Facility Name:	Permit No.:	WATER QUALITY CRITERIA				INSTREAM BASELINES			ANTIDEGRADATION WASTE LOAD ALLOCATIONS		
Churchville WTP	VA0084212	0.140 MGD Discharge Flow - 100% Stream Mix							0.14 MGD Discharge - 100% Stream Mix		
Receiving Stream:	Date:			Human Health							
South Fork Shenandoah River, UT	12/17/2014	Aquatic Protection		Public Water	Other Surface				Aquatic Protection		Human
Toxic Parameter and Form	Carcinogen?	Acute	Chronic	Supplies	Waters	Acute	Chronic	H-Health	Acute	Chronic	Health
Chlorine, Total Residual	N	1.9E-02 mg/L	1.1E-02 mg/L	None	None	4.8E-03 mg/L	2.8E-03 mg/L	None	2.6E-02 mg/L	1.5E-02 mg/L	N/A

Facility Name:	WATER QUALITY CRITERIA				NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS			MOST RESTRICTIVE WASTE LOAD ALLOCATIONS		
Churchville WTP	0.14 MGD Discharge Flow - Mix per "Mixer"				0.14 MGD Discharge - Mix per "Mixer"			0.140 MGD Discharge Flow		
Receiving Stream:			Human Health							
South Fork Shenandoah River, UT	Aquatic Protection		Public Water	Other Surface	Aquatic Protection		Human	Aquatic Protection		Human
Toxic Parameter and Form	Acute	Chronic	Supplies	Waters	Acute	Chronic	Health	Acute	Chronic	Health
Chlorine, Total Residual	1.9E-02 mg/L	1.1E-02 mg/L	None	None	1.0E-01 mg/L	6.1E-02 mg/L	N/A	2.6E-02 mg/L	1.5E-02 mg/L	N/A

PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS

According to the VPDES Permit Manual specific parameters must be evaluated for certain categories of WTPs. Unless there is data showing conclusively that Cadmium, Chromium, Copper, Lead, Mercury, and Zinc are absent, these data must be submitted and evaluated. In accordance with Guidance Memo No. 00-2011, this facility is treated as if there are not other toxic pollutants in the discharge unless there is actual evidence to indicate otherwise.

Acute and Chronic WLAs (WLA_a and WLA_c) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits.

Since the discharge is to an intermittent stream, all upstream (background) pollutant concentrations are assumed to be "0".

The steps used in evaluating available effluent data from WTPs are as follows:

A. If all data are reported as "below detection" or < the required Quantification Level (QL), and at least one detection level is ≤ the required QL, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.

B. If all data are reported as "below detection", and all detection levels are > the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.

   B.1. If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.
   B.2. If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.

C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.

   C.1. If the evaluation indicates that no limits are needed, then no further monitoring is required.
   C.2. If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.
   C.3. (Exception for Metals data only) If the evaluation indicates that limits are needed, but the data are reported as a form other than "Dissolved", then the existing data set is inadequate to make a determination and additional monitoring is required.

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
METALS					
Cadmium, dissolved	7440-43-9	0.3	Previously evaluated. No further monitoring required.	---	---
Chromium III, dissolved	16065-83-1	0.5	Previously evaluated. No further monitoring required.	---	---
Chromium VI, dissolved	18540-29-9	0.5	Previously evaluated. No further monitoring required.	---	---
Copper, dissolved	7440-50-8	0.5	Previously evaluated. No further monitoring required.	---	---
Lead, dissolved	7439-92-1	0.5	Previously evaluated. No further monitoring required.	---	---
Mercury, dissolved	7439-97-6	1.0	Previously evaluated. No further monitoring required.	---	---
Zinc, dissolved	7440-66-6	2.0	Previously evaluated. No further monitoring required.	---	---
MISCELLANEOUS					
TRC (mg/L)	7782-50-5	0.1 mg/L	**Default = 20 mg/L**	**a**	**C.2**

The **superscript "C"** following the parameter name indicates that the substance is a known or suspected carcinogen; human health criteria at risk level 10^{-5}.

CASRN = Chemical Abstract Service Registry Number for each parameter is referenced in the current Water Quality Standards. A unique numeric identifier designating only one substance. The Chemical Abstract Service is a division of the American Chemical Society.

"Source of Data" codes:
a = default effluent concentration

"Data Evaluation" codes:
See section titled PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS for an explanation of the code used.

STAT.EXE Results:

Chemical = TRC
Chronic averaging period = 4
WLAa = 0.026
WLAc = 0.015
Q.L. = 0.1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 20
Variance = 144
C.V. = 0.6
97th percentile daily values = 48.6683
97th percentile 4 day average = 33.2758
97th percentile 30 day average= 24.1210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 2.19386217607985E-02
Average Weekly Limit = 2.19386217607985E-02
Average Monthly Limit = 2.19386217607985E-02

The data are: 20

APPENDIX D

PERMIT CHANGES AND BASES FOR SPECIAL CONDITIONS

Tabulated below are the sections of the permit, with any changes and the reasons for the changes identified. Also provided is the basis for each of the permit special conditions.

Cover Page — Content and format as prescribed by the VPDES Permit Manual.

Part I.A.1 — **Effluent Limitations and Monitoring Requirements:** Bases for effluent limits provided in previous pages of this fact sheet. Monitoring requirements as prescribed by the VPDES Permit Manual. *Updates Part I.A.2. of the previous permit with the following:*

- The sample type for TSS was changed from 5G/8H to Composite and the corresponding footnote was also changed.
- More stringent TRC limits were included.
- The E. coli monitoring frequency was changed from 1/Month to 4/Month in any single calendar month.

Part I.B — **Effluent Limitations and Monitoring Requirements – Additional Instructions***: Updates Part I.B of the previous permit with minor wording changes.* Authorized by VPDES Permit Regulation, 9VAC25-31-190.J.4 and 220.I. This condition is necessary when a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

Part I.C.1 — **95% Capacity Reopener:** *Updates Part I.C.1 of the previous permit.* Required by VPDES Permit Regulation, 9VAC25-31-200.B.4 for certain permits. Included for this facility to ensure that adequate treatment capacity will continue to be provided as influent flows and/or loadings increase.

Part I.C.2 — **Materials Handling/Storage:** *Identical to Part I.C.2 of the previous permit.* 9VAC25-31-50.A prohibits the discharge of any waste into State waters unless authorized by permit. Code of Virginia §62.1-44.16 and §62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

Part I.C.3 — **O&M Manual Requirement:** *Updates Part I.C.3 of the previous permit with changes to what is required to be included in the O&M Manual.* Code of Virginia at 62.1-44.16, VPDES Permit Regulation 9VAC25-31-190.E, and 40 CFR 122.41(e) require proper operation and maintenance of the permitted facility. Compliance with the O&M Manual ensures this.

Part I.C.4 — **Concept Engineering Report (CER) Requirement**: *New requirement*. Section 62.1-44.16 of the Code of Virginia requires industrial facilities to obtain DEQ approval for proposed discharges of industrial wastewater. A CER means a document setting forth preliminary concepts or basic information for the design of industrial wastewater treatment facilities and the supporting calculations for sizing the treatment operations.

Part I.C.5 — **Reopeners:**
a. *Identical to Part I.C.4.a of the previous permit.* Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.
b. *Updates Part I.C.4.b of the previous permit.* 9VAC25-31-390.A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

Part I.C.6 — **Notification Levels:** *Identical to Part I.C.5 of the previous permit*. Required by the VPDES Permit Regulation 9VAC25-31-200.A for all manufacturing, commercial, mining, and silvicultural dischargers

Part II	**Conditions Applicable to All VPDES Permits:** *Updates Part II of previous permit.* VPDES Permit Regulation 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.
Deletions	None